Here at the office we are anxiously awaiting the signing of the Wage-Hour amendment by President Roosevelt. Immediately it is signed this issue will be mailed as we feel this information is possibly the most important legislative information the Independent telephone industry has ever received. It marks a crisis that was met with an organization that is more and more proving itself — THE UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION.

▼

We have used this column more than once to doff our hats to the officers of that Association. We now wish to enlarge our scope and include in the same category the various State Associations that have just demonstrated their value in co-operation that their many smaller members might exist. This existance was threatened under the original interpretation of the Wage-Hour Law.

▼

You smaller companies — those of you having an exchange of 500 stations or less — literally owe your business lives to the unstinting work of the Associations, both State and National, because their organization met and conquered the worst legislative crisis of your many years of service. Executives of various companies, most of them large, formed the "firing line" in Washington of the Wage-Hour Committee of the National Association. The officers of that Association are proud of their accomplishment. You too should be proud and thankful. We are! Their picture is on page 13.

TELEPHONE ENGINEER

MANAGEMENT · ENGINEERING · MAINTENANCE

Vol. 43, No. 8 **August, 1939**

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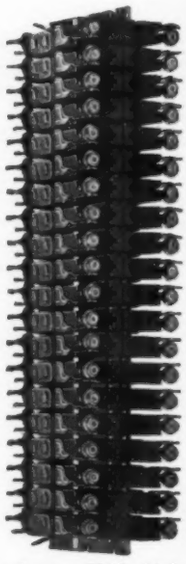

No. 100

10	pair	sections	5⅛" high
20	pair	sections	10½" high
21	pair	sections	11" high
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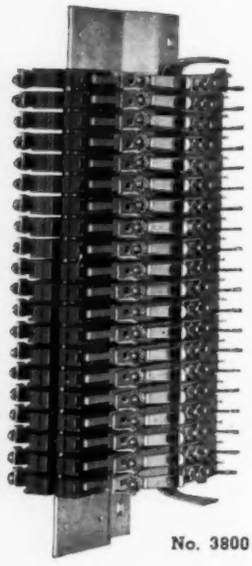

No. 3800

20	pair	sections	8⅝" high
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101	pair	sections	39" high

The No. 3800 Protector is designed for use in exchanges where minimum height is important; therefore pairs are mounted on ⅜" centers. Unit dischargers are standard equipment on the No. 3800 and optional equipment on the No. 100. With either protector, a test plug is available for testing the outside line, heat coils and switchboard circuit. Both protectors are equipped with lightning arresters and heat coils.

TERMINAL AND PROTECTION EQUIPMENT

★ COOK ★

COOK ELECTRIC CO., 2700 SOUTHPORT AVE., CHICAGO

We are reproducing in full a letter just received from the United States Independent Telephone Association reporting on the Wage-Hour amendment which has been signed by President Roosevelt. It is of news interest to the entire industry, and we suggest you read it in full.—**Ed.**

Chicago
August 10, 1939

Mr. Ray W. Smith, Editor
Telephone Engineer
7720 Sheridan Road
Chicago, Ill.

Dear Ray:

The thanks of our Association and that of all Independent telephony is due you for the invaluable assistance you have rendered during our campaign to amend the Wage-Hour Act, which has just come to a successful fruition.

This is the first serious National Campaign for legislative relief that it has been necessary for our Association to wage; and I am sure a full pardon will be granted our Wage-Hour Committee and the officers of the Association if they feel a bit disposed to crow over the successful results of the campaign, which appear all the more glorious because ours, of the many organizations who desired relief from the provisions of the Wage-Hour Act, was the only industry given any relief, to say nothing of the literally hundreds of industries which would like to have the Act amended to relieve them, but being without Associations which could effectively present their problem to Congress consequently were unable to secure any consideration. The results clearly indicate the value of a National organization such as ours which stands ready to present the needs of the Independent telephone industry whenever circumstances require it.

It is true that we who were in Washington might have secured little consideration had it not been for the effective manner in which those engaged in the field of the industry told their troubles to members of Congress. I do not recall contacting a Senator or Congressman who did not upon my stating our situation say that he knew all about our difficulties, having heard from many of his constituents back home and was familiar with our problems and wanted to do what he could to help us. As one Congressman expressed it: "The boys on the forks of the creek seem to be all with you and we will have to do something to give them the relief they are clamoring for."

Then too, the prompt answer to our appeal to managers for statistics showing how the Wage-Hour Act would affect them played a very important part in our final success.

Our great regret is our inability to secure the exemption of exchanges having 1000 subscribers or less as we started out to do—an amendment we still believe we should have. Our failure in this respect will doubtless cause some criticism from those owning exchanges of over the 500 station exemption deadline, but to those owners we can only say they nor anyone else, in our opinion, could have overcome at the recent session of Congress the opposition of the Administration to a more liberal amendment. For proof of this we cite the fact that the Agricultural interests of the country, represented by five National Associations, in Washington, approached the problem from the other angle, refusing to compromise in their quest for amendments, and failed to secure any reief whatsoever. When we felt sure the 1000 exemption was sunk, we tried to compromise on 800 and then on 750, and not until realizing the adjournment of Congress was very near did we decide "to take half a loaf rather than no loaf at all," as President Fisher expressed it.

Due to this successful effort and the many interpretations which will need to be made as to how we are to operate under the Act, I predict our coming October convention will be the best attended convention we have ever held, and through you is extended an invitation to all Independent telephone people—especially representatives of the small companies—to attend, for their own benefit and for the benefit of Independent telephony in general.

No story of this campaign would be complete without reference to the "skin of the teeth" finish, as we only won by a margin of a very few legislative hours prior to the adjournment of Congress.

May I here suggest that the members of our industry should not be backwards about giving their thanks to Senators and Congressmen who expressed a sympathetic understanding of our problem.

Again thanks to you for the splendid service you have performed and through you may we convey our thanks to the multitude of telephone company officials who received their inspiration to help from your splendid magazine devoted to the welfare of our industry, I am,

Cordially yours,
UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

Louis Pitcher
Executive Vice-President

THE STORY OF THE TELEPHONE IS THE STORY OF PROGRESS

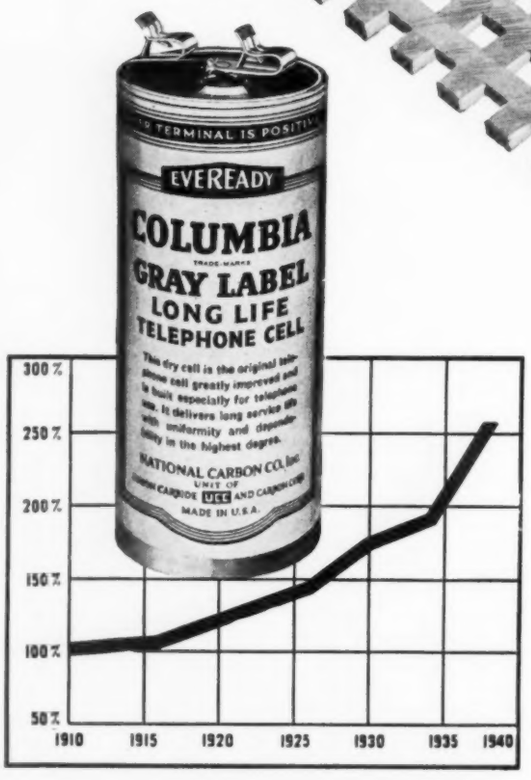
This is one of a series commemorating the long task of bringing voice transmission from a theory to its present dependability and clarity. For the data and photograph we are indebted to the Stromberg-Carlson Telephone Mfg. Co.

STREAMLINER of '94

THE DESK SET illustrated here is a far cry from today's compact, graceful handset. By the same token the *service* it gave was equally crude when compared with the fast, clear transmission the subscriber expects, and gets, today.

Man's ingenuity, plus new scientific knowledge, in this age tends to speed the development of important inventions. But we cannot dismiss lightly the astonishing progress of telephone efficiency.

Groping in the dark, facing almost insurmountable obstacles, the pioneers of the telephone industry refused to be disheartened. Lacking modern tools and materials, they went ahead—stubbornly refusing to admit defeat, convinced that somehow, some day, they would find ways to "Do it better."



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The Wage-Hour Committee of the United States Independent Telephone Association—Left to right: R. A. Phillips; J. F. O'Connell; E. C. Blomeyer, Vice Chairman; W. C. Henry; J. H. Agee, Chairman.

ASSOCIATION VICTORIOUS IN WAGE-HOUR AMENDMENT

The Telephone Industry is now paying homage to the officials of the U. S. Independent Telephone Association for their success in obtaining relief of the Wage-Hour Law. TELEPHONE-ENGINEER joins in congratulating for especial mention those whose pictures appear on these pages.
—Editor.

THE difficult seven months task of the Independent telephone industry came to a successful conclusion during the closing days of the past session of Congress, when in the space of less than a week an amendment of the Fair Labor Standards Act (Wage-Hour law) was enacted by the Senate and the House to exempt switchboard operators of telephone exchanges having less than five hundred stations.

President Roosevelt signed the bill August 9th which immediately made the amendment part of the Wage-Hour law.

The telephone industry was the only American industrial group which won a revision of the Wage-Hour law to give it needed relief from the maximum wages and minimum hours provisions during the past session of Congress. Four bills which had been sponsored in the House were shelved until the next session, while the telephone exemption amendment was unanimously adopted first by the Senate and then by the House.

B. L. Fisher, Martinsville, Va., President of the Association.

The battle was won by the Independent telephone industry and it was a legislative victory which was accorded universal approbation by the entire membership of Congress and the leading officials of the Wage-Hour Division —Administrator Elmer F. Andrews and his principal aides. Snarled up for months in the House controversy over the agricultural labor amendments as presented in the Barden bill, the telephone operators' exemption appeared to be doomed like the other Wage-Hour amendments in that measure and in the two bills of Chairman Norton of the House Labor Committee and the non-agricultural revision measure of Rep. Ramspeck, Georgia Democrat.

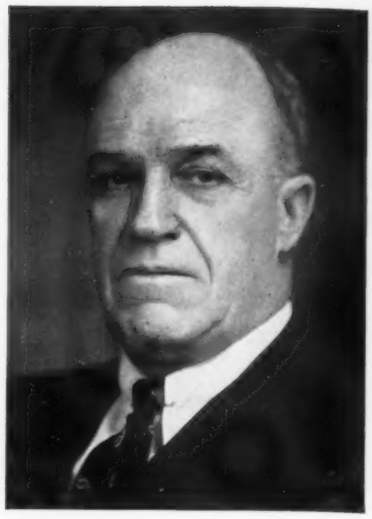
Then, a week before the final adjournment week a silver lining was produced. When the agricultural labor proponents demanded a showdown be-

By ROLAND C. DAVIES
Editor
Telecommunications Reports

Louis Pitcher, Chicago, Executive Vice-President of the Association.

fore the House Rules Committee, the unanimous approval of the telephone industry's proposal by the Congressional leaders and by Administrator Andrews was disclosed in the three days of hearings—it was the only revision of the Wage-Hour law which was universally sanctioned. Right after the House hearings, a move was launched to give the telephone industry separate treatment.

SENATOR HERRING, Democrat, of Iowa, who early in the session had supported the goal of the telephone industry to secure an amendment to preserve the operations of the small telephone exchanges, presented his bill (S. 1234) to the Senate Education and Labor Committee which gave it unanimous approval. Then on Tuesday of the adjournment week (Aug. 1) the Senate without any debate and without a record vote passed the bill. Two days later, the House under the unanimous consent procedure, usually a difficult hurdle for any measure covering a controversial subject like the Wage-Hours legislation, likewise, gave its approval after a few minutes discussion and with no record vote. The House action was the final Congressional enactment and the telephone exemption bill was sent to the President.



C. C. Deering, Des Moines, Secretary-Treasurer of the National Association.

The bill adds another subsection to Section 13 (a) of the Wage-Hour Law which is the Exemptions provision of that statute. It exempts from Sections 6 and 7 of the Fair Labor Standards Act, the maximum wages and minimum hours provisions, in the following language "Section 13 (a)**** (11) **"any switchboard operator employed in a public telephone exchange which has less than five hundred stations.**

In their reports, the Senate and House Labor Committees, approving the bill, stressed that "the exemption was necessary to insure uninterrupted telephone communication service for the farmer and the small rural community." The Senate Labor Committee cited that Administrator Andrews had endorsed the amendment, and although he had first approved an exemption of 350 stations, after further studies he became convinced of the proper validity of the 500-station figure. The favorable report of the House Labor Committee stated that "this bill exempts from both the minimum wage and maximum hour standards of the Act, any switchboard operator in a public telephone exchange which has less than 500 stations. The exemption for the operators of some small telephone exchanges is necessary to insure uninterrupted telephone communication service" for the rural areas, especially, and small telephone companies need the relief from the wages and the sporadic character of their service makes the application of the hours provision impracticable.

WHILE the telephone industry as represented by the Wage-Hour Committee of the United States Independent Telephone Association had felt the 500-station figure was too low for adequate relief of all rural telephone

(Please turn to page 30)

Mr. Ray W. Smith, Editor,
Telephone Engineer,
7720 Sheridan Road,
Chicago, Illinois

Dear Mr. Smith:

Thanks for your kind letter of May 31 and your offer to supplement the article appearing in the April issue of the Telephone Engineer with some factual data concerning the so-called "Vest-Pocket Telephone."

Truth is indeed stranger than fiction, but fiction sometimes travels so fast that truth gets discouraged trying to keep up.

The origin of the now somewhat comical vest-pocket telephone story is this:

Last fall I addressed a Woman's Club in Pasadena, at which (unknown to me) a lady reporter was present. The subject was "Frontiers of Tomorrow." and dealt not only with some prognostications concerning the future of communications generally, but also a brief background of the developments in the art today.

For example, I described the operation of radiotelephony, by means of which vast distances are bridged without wires. I also discussed a number of other by-products of the telephone, among which were the public address system and the audiphone. This latter you will recognize as an individual hearing aid, and is now quite compact. I described it as being small enough to fit in the vest pocket. I also stated that both the public address system and the audiphone were specialized applications of the telephone principle.

Whether the lady reporter dozed through a portion of my doubtless dry remarks or whether the semi-technical tone of what I said confused her, I'll probably never know, but the fact remains that a small suburban daily in a near-by town carried a report of my speech under a Pasadena date line substantially as you reported it.

Of course, we attempted to correct the improper reporting and I believe the newspaper ran a correction in a subsequent issue.

However, the damage was done, and here's where the comedy begins to come in. One of the popular science publications clipped the original story, and thereupon I began to hear from "The Vest-Pocket Telephone" from strange and unexpected sources. Individuals in various parts of the world—Rio de Janeiro, Australia, Alaska, New York, etc., began to bombarb me with inquiries regarding my "new contribution to science." Needless to say, the story quickly passed the joke stage, and I was kept busy for several months trying to explain myself.

Then when I had hoped that the whole thing had blown over, the Telephone Engineer, with the clipping from the Denver Post, came to my notice—the rest you know.

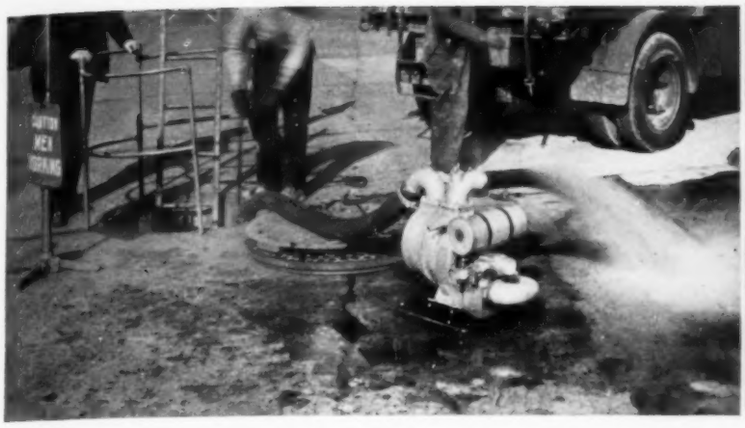
I don't blame you in the least for the error, and I appreciate this opportunity to correct in the minds of your readers the false impression conveyed by the error in reporting.

I DID talk about telephoning without wires. Any radio or telephone engineer knows how this is done. I DID talk about other applications of the telephone principle and described the audiphone which fits in the vest pocket, but I DID NOT say anything about talking around the world without wires from a telephone that fits in the vest pocket.

Futhermore, I am resolved never to mention vest pockets at all in any of my future speeches.

Cordially yours,

Dean T. Smith



A 3" pump dewatering manhole. Many of these were in service after the storm in New England last September.

Portable generator being used to operate an electric hammer drill.

PORTABLE ELECTRIC GENERATORS IN THE TELEPHONE FIELD

By
RAY BLAIN

STRANGE as it may seem very little is known of the numerous possibilities of using small portable gasoline engine driven generators in the telephone exchange. Not only may these machines be used as a power supply for charging storage batteries and to provide lighting in case of a power failure, but they may also be utilized to advantage in the operation of portable electric tools of all types on general telephone construction work.

The remark is frequently made that emergency power in the modern telephone exchange is not necessary due to the reliability of the present commercial power supply. While we must admit that this is true to a great extent, storms do occasionally cause interruption of all power service in certain areas for extended periods of time. Take for example the tropical hurricane of September 1938 which caused unprecedented destruction and left in its wake practically a complete disruption of electric service in Nassau and Suffolk counties which constitutes the suburban section of Long Island in New York State.

Immediately three portable 55-volt Direct Current emergency gasoline engine charging sets of the telephone company were pressed into service in order to maintain sufficient central office battery reserve to insure continuous operation of all the exchanges in the system. The next morning after the storm it became evident that many telephone buildings would be without power service for a considerable time so a rush order was placed for three more of these small generators which were assembled and delivered on the afternoon of the same day. The facility with which these sets could be transported and placed in service made it possible to shift them from one office to another so as to maintain in a charged condition all of the central office storage batteries. There is no doubt on the part of this telephone company but that these little generators assisted materially in maintaining continuous telephone service on the system during the storm when telephones meant so much to the good people of that section of the country.

WHILE these portable generators can ordinarly be obtained in various current and voltage ranges the 650-watt size direct current machine with a voltage range of 27 to 42-volts for charging 12 to 18 cells and 42 to 63-volts for charging 16 to 25 cells is the machine preferred for charging telephone batteries direct from the machine. This particular machine complete with direct-connected gas engine weighs only 71 lbs. The 1250-watt direct current machine in the same voltage range weighs 89 lbs and the 300-watt size 135 lbs.

Alternating current machines of the same type are available in four sizes from 500, 1500 and 2500-watts at 110-volts. The 1500-watt size weighs only 94 lbs. complete with gasoline engine. Direct current machines may also be obtained at 110-volts up to 3000 watts and weigh only 125 lbs. From the numerous machines available a size and type may be selected that will satisfactorily handle practically all ordinary jobs in the average telephone exchange.

While any of the above mentioned machines will prove entirely satisfactory for the purpose for which they are designed, it is believed that the 110-volt alternating current machine will prove most desirable for general all purpose telephone work. The regular telephone power equipment in any telephone exchange includes necessary rectifiers or generators for converting alternating current to direct current for battery

The gas engine generator is small and takes very little room in a truck or in storage.

Arc cable repair set which operates from 110-volt current supply. This set can be satisfactorily operated from one of the portable generator sets.

charging. Also ringing equipment is generally provided for operating direct from the alternating current commercial power supply. When the commercial power fails the portable emergency generator if it be of the alternating current type may be connected at the main supply switch and used to operate the charging equipment and ringing machines direct. Another advantage of this type machine is that it will also provide current for lighting in the exchange which is in itself a most important item during a severe storm. Some telephone companies provide emergency lighting from low voltage bulbs connected to the storage battery though this is not entirely satisfactory and naturally increases the drain on the storage battery at a time when its full capacity may be required for the proper operation of the system. The load on any telephone system is always heavier during a storm and the calling rate invariably increases during a power failure.

In the construction of the gasoline engines used with these portable generators only the finest of materials are used throughout. This includes heavy duty ball bearings, drop forged counter balanced crankshafts, watertight high tension ignition coil and aluminum crank case. The operation of these engines is simplicity indeed and they are as trouble-free as it is possible to make any machine. To start the engine merely pull out the choke give it a turn and away it goes without fuss or bother. There are no instruments to watch or controls to adjust for they are completely automatic in their operation. These engines start easily in subzero weather. The high tension waterproof magneto shoots a hot spark at slow cranking speeds. Advanced type carburetor and independent rotary valve insure smooth running at all times. There is no danger of these engines freezing or overheating for they are of the air-cooled type. So carefully are these units constructed that many of them have been in service for over 15 years with a minimum of trouble.

ONE of the outstanding characteristics of these generator units is their ready portability which greatly increases their usefulness and value in the telephone field. Because of their light weight and compactness, one can easily load it or unload it from a car or truck for transporting to the point where the light or power may be required for instant use. The units occupy only a small space and may be conveniently stowed in any out-of-the-way place or corner of an automobile or truck. Or if preferred it may be carried on the running board where it is held in place by bolts or clamps.

These units may also be obtained equipped with self-starting and remote control equipment consisting of starting switch, cable, relay switch and automatic choke, when desired. Suitable electric outlets and two binding posts are provided on all machines as regular equipment. A pilot light and three additional cable outlets may be obtained when required to meet some special condition. An auxillary gasoline tank of five gallon capacity may also be obtained for use on any of the generator sets.

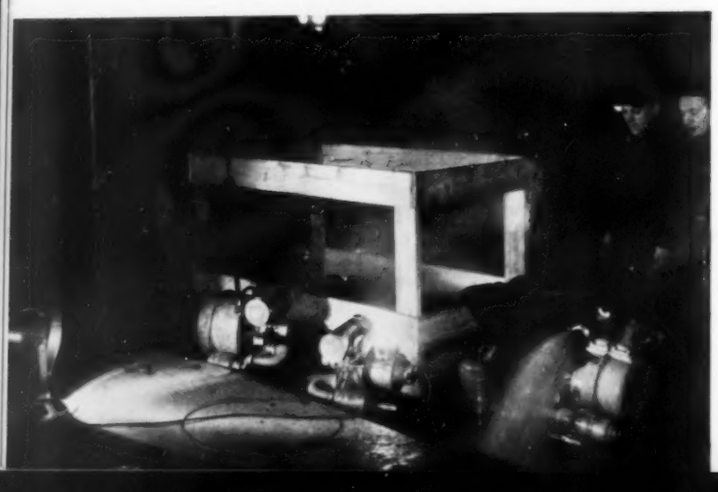
This small compact engine may also be obtained direct connected to a pump or blower. These units will ordinarily, prove ideal for use by larger telephone companies for pumping water out of manholes or blowing air to clear gas from a manhole to make them safe for the entrance of workmen.

Present day portable electric tools may be used to advantage as money and labor savers on numerous types of work in the telephone exchange. These tools may also be used to advantage out on line jobs when electric current may not be available. Extension cords may be used occasionally for this purpose but such cords if of any great length are always dangerous, slow and difficult to use. The portable gas engine generator set solves the current supply question with complete satisfaction when it is desired to use electric tools at various locations around the telephone exchange or out in the country on rural or toll lines. We are firm in our belief that no set of line tools will be complete without one or more of the portable gas engine sets. These sets will also undoubtedly prove a worth while investment in any telephone exchange.

SOME telephone men may be of the opinion that little saving may be realized by the use of portable electric tools out on the line. However we have used a number of such tools on actual work over a period of years and have found them to be entirely satisfactory and big savers of labor. Space here will permit a description of only a few of the tools we have used to advantage when operated from one of these gas engine generator sets.

Drilling holes in concrete, brick or stone walls for the mounting of fixtures

(Please turn to page 22)



LEFT

Portable generator, pump and blower on emergency job in manhole. Notice flood light which is also powered by generator.

RIGHT

The generator connected to an electric hammer drill.

Short Course in Telephone Transmission

PART V

By
B. C. BURDEN

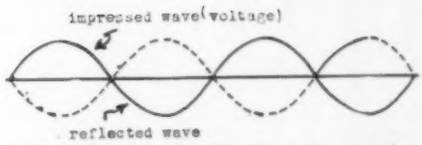


Fig. 2—Impressed and reflected waves due to open circuit on line.

Reflection Effects and Loading Theory

Reflection Loss

IN PREVIOUS sections of this series of articles dealing with telephone transmission, we have learned that telephone currents are attenuated in passing over a line due to the resistance, capacitance, inductance, and leakage of the line. These losses are tangible and easy for us to understand. There is, however, another loss that occurs in communication transmission lines that is more difficult to grasp, yet nevertheless a tangible loss that may occur in any system. This loss is due to the *reflection* of the transmitted wave in any circuit in which the impedance at the receiving end of the line is not equal to that at the sending end. This condition is analogous to that which takes place with other mediums, as for example light waves. When a light wave passes through the air and then into a window glass some of the light passes through but a part is *reflected*. (See Fig. 1.) The degree of reflection will depend on the nature of the two mediums through which the light passes.

To illustrate how reflection takes place in a telephone line let us assume that a voice wave is being transmitted from the sending end of the line which has an impedance of 600 ohms towards the distant end of the line which is open. When the wave travelling out from the sending end reaches the distant end of the line it being open there is no impedance to absorb the wave. Inasmuch as this wave has part of its energy stored in the electrical field and part in a magnetic field, the magnetic field will collapse at the end of the line due to the fact that the current becomes zero upon reaching the open circuit. This collapsing magnetic field produces an electric field, thus building up a voltage at the open end of the line and this voltage in turn starts a wave travelling back in the opposite direction towards the sending end. Theoretically, this returning or reflected wave will have almost the same magnitude as the originating wave. The voltage which exists at any point along the transmission line will therefore be the algebraic sum of the outgoing wave from the sending end and the reflected wave from the receiving end of the line.

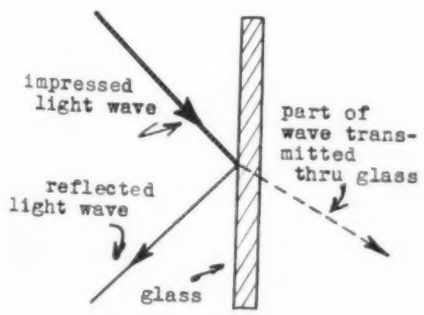
Standing Waves

It is particularly interesting to note that at certain points along a transmission line the reflected wave will completely cancel the impressed wave with the result that a zero voltage will be measured at this point at all times, while at other points, the two waves will add so that the voltage will be approximately double the normal impressed voltage. The points at which zero voltage exists are referred to as *nodel points* while those which are double the normal voltage are known as *anti-nodes*. This is shown in Fig. 2.

The nodal points occur at odd quarter wave lengths from the open circuited end of the line and the double voltage points at even quarter wave length points. The current wave undergoes the same changes as the voltage wave except these are of course out of phase with the voltage changes. At points along the line at which the voltage may be zero the current will be maximum and vice versa. This phenomenon in which a reflected wave interfering with the transmitted wave causes points of maximum and minimum voltage to occur on a long line is referred to as *standing waves*. Due to the fact that the frequencies used in telephone communication are relatively low hence the distance occupied by a standing wave is long it is not feasible to physically demonstrate the fact that standing waves exist.

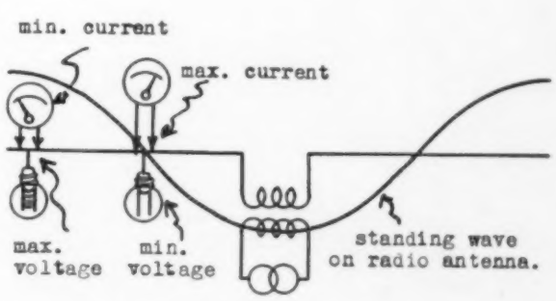
Standing Waves on Radio Antenna

Standing waves can readily be demonstrated with the higher frequencies used in short wave radio work. For example, at 50,000,000 cycles the wave length is approximately 20 feet, as against ap-



LEFT: Fig. 1—Reflection of light waves due to passing from air into glass.

RIGHT: Fig. 3—Standing wave on short wave transmitting antenna.



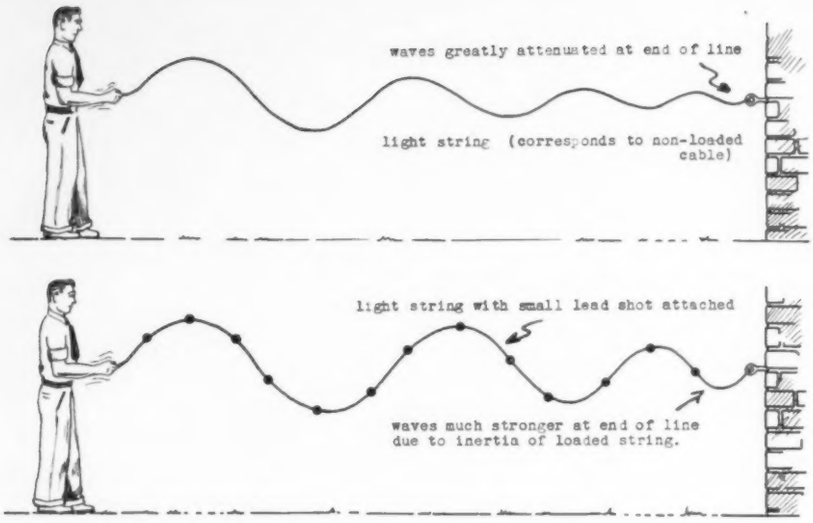

waves greatly attenuated at end of line
light string (corresponds to non-loaded cable)
light string with small lead shot attached
waves much stronger at end of line due to inertia of loaded string.

Fig. 4—Mechanical analogy showing effect of loading on wave attenuation.

proximately 175 miles at 1000 cycles. Therefore with a suitable radio oscillator feeding into a wire 20 feet long as shown in Figure 3 and with the ends of the antenna open, standing waves can be made to appear on the wire. If some device capable of measuring high frequency voltage as for example a neon lamp is moved along the wire the light will glow with maximum brilliancy at the voltage anti-node points as shown in the illustration. Likewise if a meter capable of indicating current is connected in series with the antenna at various points along its length it will show zero deflection at the end of the wire and maximum deflection at quarter wave length points from the end of the wire.

Practical Effects of Reflection Losses

WHILE it is interesting to those wishing to be fully informed on the general theory of transmission work as to the exact effect of reflection losses it should be noted that these losses are not of sufficient magnitude in ordinary telephone circuits such as are commonly found in Independent telephone plants as to warrant much concern. As an illustration of the magnitude of reflection effects let us take a typical example. If a 200 ohm impedance having a positive angle of 60 degrees is connected to a 700 ohm impedance whose angle is 30 degrees the reflection loss would be approximately 1.4 db as compared to the ideal situation in which the impedances are equal. Ordinarily the impedances of telephone apparatus is closer matched than this and hence the losses negligible.

Computation of reflection losses is somewhat complicated, however, simple charts are available which show the magnitude of a reflection loss in terms of the receiving and sending impedances and their respective angles.

In the case previously discussed we assumed that the receiving end of the line was entirely open, if the receiving end of the line was short circuited the reflection effect would also occur.

Measurement of Impedance Irregularities

The location of impedance irregularities that often occur on long toll lines due to connection of the wrong type of equipment, open circuits, faulty load coils, and other causes can be determined by a unique measuring method which involves the use of an *impedance bridge*. This method involves measuring the impedance at the input end of the line over a frequency range of several thousand cycles. The impedance at the input end of a telephone line will vary with frequency if the line is not smoothly terminated at its distant end. The impedance varies due to the fact that the reflected voltage due to the impedance irregularity may cancel the input voltage thereby making the line look like a high impedance to the measuring instrument, or at a slightly different frequency the reflected wave may add to the impressed voltage making the impedance look quite low to the measuring instrument. Inasmuch as the phase relationship between the impressed and reflected waves at the input end of the line will depend on the measuring frequency by varying the input frequency over a given range the input impedance measured will vary. By taking into account the *velocity of propagation* and the frequency reading corresponding to adjacent impedance readings on an impedance curve which is plotted from the readings it is possible to compute the distance to the impedance irregularity. The formula used for this purpose is given as follows:

$$D = \frac{V}{2(f_2 - f_1)}$$

Where D=distance in miles to the irregularity

V=the velocity of propagation

f_2 and f_1= the two adjacent frequencies corresponding to maximum measured impedance

Other Bad Effects of Reflection

REFLECTION effects in addition to causing a loss in power transmission will also cause frequency and phase distortion. On a long telephone line consisting largely of cable which is loaded to reduce its losses the velocity of propagation is quite low, hence on a toll line several thousand miles long appreciable time is required for telephone waves to travel from the sending to the receiving end of the line. If an impedance irregularity exists at the receiving end of the line the wave will be reflected back and due to the appreciable time required for it to travel back to the receiving end of the line it may be heard as a distinct sound or echo which will distort and interfere with normal conversation. Hence long toll circuits are necessarily equipped with what is known as *echo suppressors* which are placed at repeater points for the purpose of preventing echo effects.

Difference Between Reflection and Transmission Losses

As was explained in the previous article it is desirable and necessary in a telephone system to keep the sending and receiving impedances equal to each other in order to affect a maximum transfer of energy from the sending source into the receiving device. The ideal transfer of energy results when the sending end impedance is equal in magnitude and phase and opposite in phase angle to that of the receiving end of the line. Any deviation from this condition is referred to as a *transition loss*. This effect must not be confused with the *reflection loss* which is a different phenomena and is due to the inter-action of the reflected wave with the impressed or normal wave.

Loading Coils

In the early days of telephony as long distance circuits began to spread out from the east it became apparent that something would need to be done to reduce line losses if countrywide long distance service was to become a reality. As a result of this need there was developed the *loading coil* and the *telephone repeater* and it was these two items more than anything else that has given us not only countrywide but worldwide telephone service.

Although neither load coils nor repeaters are found in the average Independent telephone plant some information on the general theory and use of these two important items of communication

(Please turn to page 30)

Editorial

Adequate Rates

While Congress gave relief from the Federal Wage-Hour Law to Independent telephone exchanges with less than 500 stations in the form of an amendment to the Law, there is no doubt but that many exchanges having 500 or more stations will find it necessary to increase their rates in order to comply with the wage and hour requirements of the Law.

This is true because many Independent exchanges above the 500-station mark, due to local conditions have not, for several years, earned an adequate return and to put the Wage-Hour requirements into effect would mean either the replacement of a present small earning with a substantial deficit or a further increase of a present deficit. Therefore, it is not unlikely that, regardless of the amendment passed by Congress, there will be a demand for increased telephone rates.

In making preparation for rate increases for the smaller exchanges there is one suggestion that could well be considered. During conversations with owners of these smaller exchanges we find there is a tendency for them to consider increases in rates which would cover ONLY the bare increased cost of placing the Wage-Hour requirements into effect without taking into account whether or not they are presently earning an adequate return on their investments. It would seem that in planning rate increases the owners of these smaller exchanges should determine their present earning rate. If the earnings are inadequate then it would seem that good business judgment would dictate that they should ask for rates sufficient to cover the Wage-Hour expenses and the cost of the other burdens that have heretofore been absorbed by the exchanges so as to bring up their earnings to a just and reasonable level.

It would seem wiser and practicable to seek, at one time, rates that would cover the above requirements rather than face the necessity of initiating two separate rate increases to bring about the same results. Rate adjustments in the past have occurred only every 10 to 20 years so it would seem desirable to make a complete adjustment unless the rate necessary is prohibitive, in which case it would seem necessary, in addition to increasing rates, to curtail service.

It is believed that State Regulatory Commissions should, upon proper showings by telephone exchanges, grant sufficient rates to cover the additional expense caused by higher wages and shorter hours for labor and also to give a just and reasonable return on their investment. To do otherwise the property and service of the average small exchange will begin to deteriorate and result in eventual abandonment of its operation, thereby depriving the community of telephone service and increasing unemployment rolls.

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Portable Generators In Telephone Field

(Continued from page 16)

or through them for the entrance of wires is always a slow difficult task when the hand drill method is used. This work is converted into a very simple task when an electric hammer drill is used. Frequently in new buildings holes must be drilled or fixtures mounted before commercial power is available and hand work is always slow and expensive. We frequently move our generator set into such buildings and use it with complete success to accomplish the work.

Poles are ordinarily purchased these days with all gains cut and holes bored. However, when this is not done an electric drill and saw can be used to advantage in the pole yard. We recently purchased some poles which had numerous large, unsightly knots which we considered should be removed prior to installation. Their removal proved a slow, expensive process when using an axe and draw-knife by the hand method but a portable electric planer solved the problem and made possible a much better job. The electric saw is fine for roofing poles and may also be used for numerous other work around the average exchange.

Occasionally rush construction work or repairs to plant must be made at night and in such event proper lighting is always most important. The portable 110-volt generators of either alternating or direct current may be used to supply current for floodlights which, if properly used prove adequate for all such work. Floodlights of either 200 or 500-watt size may be obtained for use with the portable generating units. Two of these lights will ordinarily prove adequate for the average telephone night job and one generator will satisfactorily handle the load. These floodlights are provided with a universal mounting and an adjustable socket so that they may be quickly set to throw maximum light where it will do the most good.

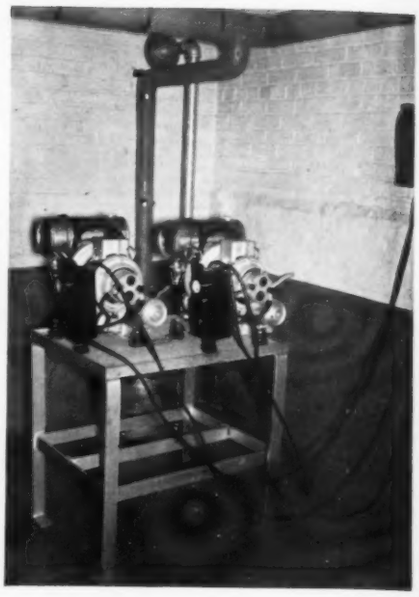
Paintspray being used to paint outdoor telephones. The generator set can be used to advantage for supplying current on jobs of this nature.

Small power paint sprays may be purchased at a reasonable cost which prove so much better than a brush for an inexperienced man to paint certain objects in the telephone plant. Recently we had a number of outside, iron case telephones and standards to paint with aluminum. This proved most difficult brush job but the spray gun operated by the generator set saved the day. Cable boxes were also painted in a similar manner with complete success. The butts of creosoted poles are often painted with aluminum for a few feet above the ground level when they are placed along the side of a motor highway to reflect the light from passing cars. The paint gun and generator set was loaded into a truck and used to advantage on several large jobs of this nature.

FEW manholes were ever constructed which did not require pumping out occasionally when it is necessary to work in them. Various types of pumps, both power operated and of the hand type may be obtained for this purpose. The power pumps are generally preferred though due to their comparative high cost the hand type are generally used in the telephone field. Small electric operated pumps may now be purchased for less than $50.00 which, when operated from the small portable generator sets make an ideal arrangement for removing water from all types of telephone manholes regardless of their location in the plant. This outfit may also be operated from a truck by using a longer section of hose or may be placed on the ground near the manhole being pumped.

Electric manhole heaters to operate from the portable generators are now available. Those heaters have an electric heating unit and a fan for moving the air through the manhole. The natural heat from the engine is also utilized in the heating arrangement. These heaters prove highly desirable for use in extremely cold climates when cable must be spliced in the wintertime.

Arc type soldering and cable repair outfits may be successfully operated from the 110-volt generator sets. These arc sets may be used to advantage on so many jobs around the telephone exchange that we are of the opinion that their use in the telephone field will be greatly increased during the next few years. Storage batteries may be used on small sets but the generator set insures continuous operation and reliable power. The generator set also proves more economical for work of this nature.



2—1250 Watt Portable generators connected for emergency battery charging in Telephone Central Station, Haddonfield, N. J.

On an underground cable construction job where the ditches were dug by hand by the pick and shovel method, a small portable electric grinder was used to help keep the shovels sharpened. This grinder was operated by one of the portable generator units, and was in almost constant operation. There is no doubt but that this arrangement saved us considerable money on this job by keeping the tools in good condition.

On another job it was necessary to bore large holes through a great number of timbers to construct fixtures to be used in attaching a cable to a steel bridge on a river crossing. A portable electric drill on a stand was operated from one of the generator units and completed the job in record time and with complete satisfaction. Performing this work on the job where measurements could be checked proved a real advantage and a time saver.

THAT the use of portable electric tools in the telephone exchange of the future will be considerably increased there seems to be no doubt. We are of the opinion that in the not far distant future someone will design some type of an electric duct rodding outfit. Also it appears possible to design a small portable auger, electrically operated for digging holes for anchors and small poles. A small electric auger for bor-

(Please turn to page 30)

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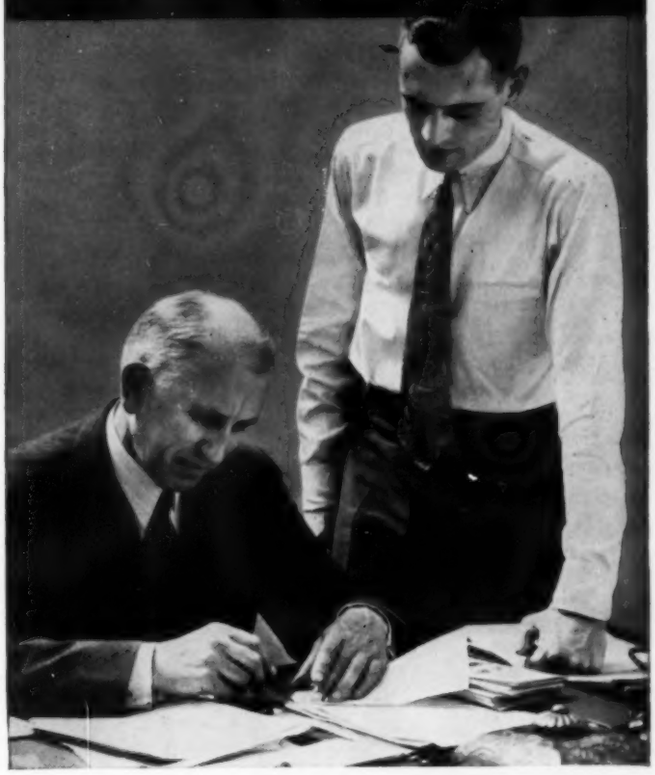

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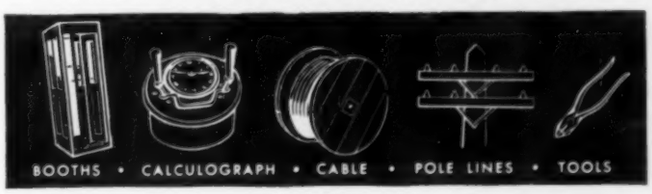

LINE and DESK

RAY BLAIN, Editor

Q. What size of truck would ordinarily be used with a special body for a telephone line construction truck?

A. Opinions differ on this question though we believe that the 2-ton size will ordinarily meet all telephone requirements in the average Independent Telephone exchange.

Q. Is it considered necessary to ventilate telephone manholes?

A. We are of the opinion that ordinarily a permanently installed ventilating system is not necessary. Power manholes which have transformers installed in them are often ventilated to carry off the heat load. We are of the opinion that ventilating a telephone manhole, except when it is necessary to work in them would not serve any useful purpose.

Q. What type of conduit would ordinarily be recommended for extending an underground cable from a manhole into a building?

A. Wood, fibre or clay type conduit are the types most commonly used for this purpose. Iron pipe is used occasionally though if not properly drained can cause considerable trouble in freezing climates.

Q. We have some 85-foot poles to erect and would be pleased to know what method should be used to insure safety?

A. We would recommend the gin pole method for all practical purposes in the average telephone exchange. A gin pole about 50-feet in height should be erected and guyed and this in turn used to erect the longer pole. If properly used this method will prove entirely safe.

Q. Is it possible to obtain clamps for use in attaching switchboard cables to racks and runways?

A. Such clamps are available though we doubt that their use would prove desirable on any except the larger jobs. On smaller jobs we are of the opinion that the old method of sewing cables to the rack with lockstitch would prove more desirable and economical.

Q. Which is considered the better method of pulling wire and strand to the proper tension; the dynamometer method or the oscillating method?

A. In our opinion both methods prove entirely satisfactory when properly used. The oscillation method must be used with care to insure satisfactory results. The dynamometer method is rapidly gaining favor and will no doubt be generally used in the future.

Q. What is the average length of 50-pair, 22ga. cable that can be obtained on one reel?

A. Ordinarily this cable is received in about 3000 feet lengths in one piece on an ordinary reel. It can probably be obtained in greater lengths on special order. However, the 3000 ft. lengths are generally greater than can be used in one piece in the plant anyway.

Q. How may poles be stepped to discourage unauthorized persons from climbing them?

A. This has ever been a problem and the best method we know of is to use only one wood or butt step about three feet from the ground and place two iron steps opposite each other about 6-feet from the ground level. This tends to make climbing difficult, especially for children.

Q. Is it possible to carry a pole derrick on a line construction truck without blocking one door of the cab?

A. The transportation of a pole derrick on a line construction truck has always presented a rather difficult problem. Some truck body manufacturers provide a carrier for their pole derricks above the cab door. No doubt but that this method is a step in the right direction.

Q. We note that some telephone companies are installing extra protectors on open wire lines a few spans from the cable terminal. Is this practice considered necessary to provide good protection?

A. We are of the opinion that if you are located in a section of the country where lightning is severe this method may be justified. We assume, however, that you intend to install the regular protection with open space cut-outs and fuses at the cable terminal and open space cut-outs without fuses on the open wire lines a few spans from the cable terminal. There is no doubt but that adequate protection is much cheaper than repairs to cable.

Q. When laying clay conduit we have experienced considerable difficulty in getting the bottom of the trench perfectly level in order that the joints will be in line. Can you advise us of any method whereby this difficult job may be made easier?

A. It is always a difficult job to dig a trench with the bottom smooth so that clay conduit may be laid properly. The best method we have found is to dig the trench with the bottom fairly smooth then throw in some loose dirt and smooth it down and tamp slightly. This method not only provides a smooth level trench bottom but also acts as a cushion for the conduit.

Q. Is it considered permissable to use switchboard cords until the reinforced section has been entirely consumed by rebutting?

A. Opinions differ on this question though we are inclined to agree with one large company who specify that cords may be used until only 1 inch of the reinforced section remains outside the plug. This means that at least 3" of the reinforced section must be available before starting to rebutt the cord the last time. Some claim that switchboard cords should be discarded when they have been used down to 6 inches of the reinforced section though we believe this to be a useless extravagance. It is true that the reinforced section tends to guide the cord back into the key shelf though we do not believe that this feature is worth the cost of a more frequent changing of cords which are otherwise satisfactory. Others claim that cords become defective after prolonged use due to the absorption of perspiration and the natural oils from the operators hands though in this we do not agree. The perspiration is absorbed by the cord at the base of the plug and this section is removed each time the cord is rebutted and before it can cause serious trouble.

Address Questions to Line & Desk Editor

Ray Blain

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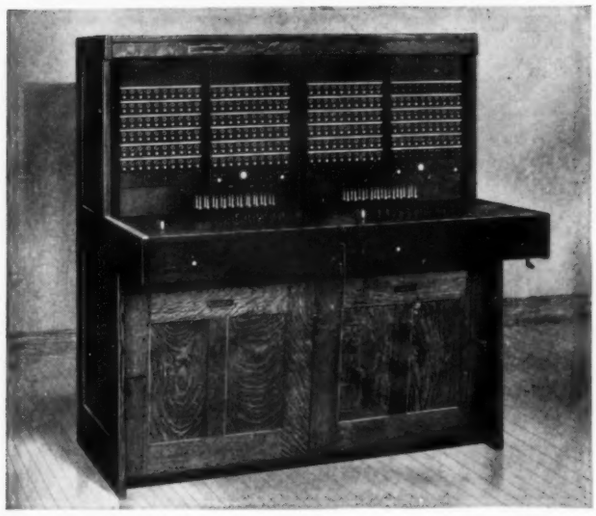

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MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR MORE THAN FORTY YEARS

A Ringing Machine for Small Offices

By R. D. de KAY

Power Development Department
—Bell Telephone Laboratories

IN large central offices a variety of tone signals are required to expedite the operating procedure, and these as well as ringing current are supplied by motor-generator sets. For private branch exchanges and for the smaller central offices ringing and tone supply are also required, but the load is much lighter so that the large motor-generators are not economical to use. To meet the requirements of these smaller offices a number of types of equipment have been employed, depending on the size and requirements of the office, and for the most part have given excellent service. None of them, however, have sufficient tone and interrupter equipment for some of the new community dial offices; and for the most part they permit a greater variation in output voltages than is desirable for some applications. A new small ringing machine thus seemed necessary.

What was desired was an assortment of tone and interrupter circuits comparable to that of the larger motor-generator sets but without the large size and cost of the more extensive installations. To meet this need, the KS-5510 ringing machine, shown in Figure 1, was developed. Instead of being a motor-generator as the larger sets are, it is a rotary converter like the qn design, one of the smaller machines. A rotary converter combines a d-c motor and an a-c generator in the same unit, having a common set of field coils and a single armature, with a commutator on the motor end and slip rings on the generator end. The converter runs on current from the office battery, and 20-cycle a-c is taken from the slip rings, through a step-up transformer, for the ringing supply.

On a shaft extension at the commutator end are four rings for supplying the high and low tones, from which the various tone signals are derived by interrupting the continuous tones at various rates. Each basis tone is produced by a slip ring and a segmented ring with its alternate segments connected to the slip ring. The number and width of the segments are proportioned so that battery current passing in through the slip ring is interrupted at the proper rate. The changes in current are converted by means of repeating coils into alternating voltages or tones having frequencies equal to the revolutions per second of the machine times the number of interrupting segments in each ring. Beyond the tone rings is the centrifugal speed regulator, which maintains the speed of the set within the required limits.

At the other end of the converter, beyond the main slip rings, is a worm driving a gear on a counter shaft, which rotates at 10 rpm. This is the interrupter shaft. It is arranged to mount as many as six disks, each drilled around its periphery to take on each side one or more pins with sleeves over them to act as rollers. Each such disk has a set of contact springs that the pins raise and lower as the shaft rotates, and each set of springs acts as an interrupter for ringing current or for one type of tone. As many are mounted as needed up to a maximum of twelve.

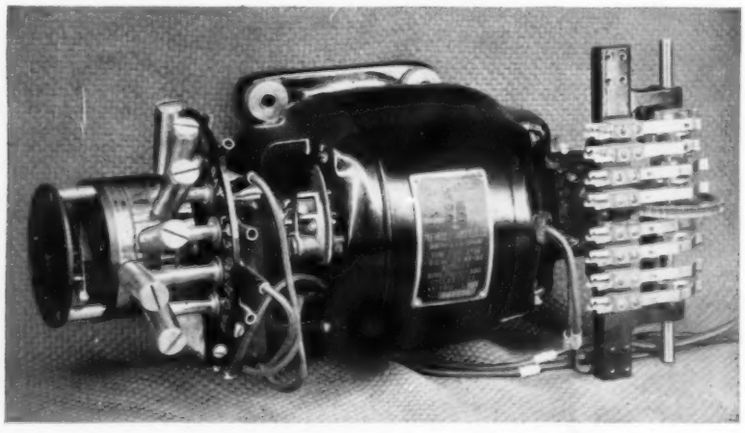

Fig. 1—The KS-5510 ringing machine with interrupter shaft shown at the right.

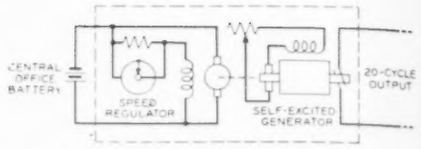

Fig. 2—Simplified control circuit for a motor-generator set.

Although a rotary converter has the advantage of being a smaller and less expensive machine than a motor-generator, speed regulation with it becomes more difficult. With a motor-generator set, there are two separate machines, each with its own field, and an adjustment of the field of the motor—made to hold a constant speed—has no effect on the voltage of the generator. The speed regulator of such a set has a contact that opens and closes a short circuit around a resistance in the motor field circuit. As the motor slows down, the period of short circuit is reduced and that of open circuit increased, so that there is a net decrease in average field current and a corresponding increase in the speed of the motor. A simplified schematic of such a set is shown in Figure 2.

With a rotary converter, however, the same field serves for both motor and generator, and if the field current is decreased to offset a falling speed, the generated voltage will decrease. To avoid this, a resistance is inserted in the armature circuit, as shown in Figure 3, and the regulator contact is allowed to short circuit this resistance for longer or shorter periods as the motor slows down or speeds up. Both speed and voltage vary directly with the voltage across the armature, and thus increase as the armature resistance is shortened out for longer intervals. A series field is also used with the rotary converter and brings in an additional stabilizing factor.

A modified form of this machine, called the KS-5546 code-ringing machine, is arranged to give the code ringing commonly used on rural lines. Since as many as twenty parties may be connected on such a line more interrupter springs are required. For this reason the interrupter shaft is made long enough to accommodate eighteen spring pile-ups, eleven of which are used to furnish the codes alone. Since cost is particularly important in these small offices, the speed regulator

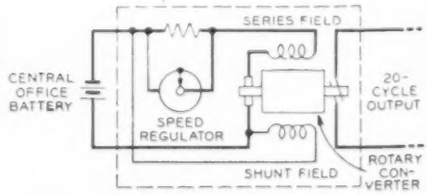

Fig. 3—Control circuit for converter set.

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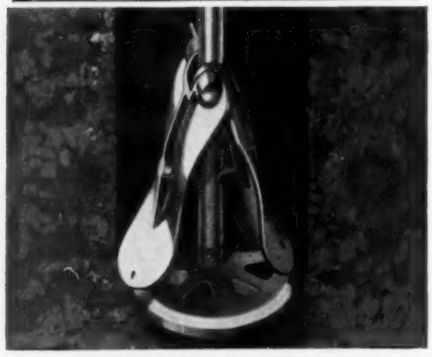
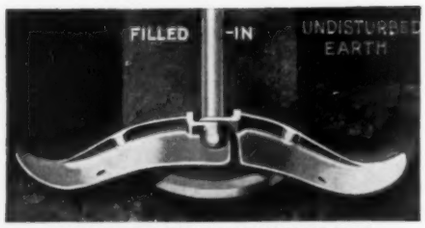


DEMAND ANCHORS MADE OF GENUINE



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has been omitted. This results in wider voltage variations in the ringing output, and the rating of the machine has been slightly decreased, which is permissible because of the light load under which these offices operate. For the same reasons it has been possible to use smaller brushes on the tone rings, and thus make another small savings. As a result of the accumulated savings this code-ringing machine will give a greater variety of signaling interruptions than the KS-5510 machine, and at the same time will cost less.

Convention Report Oregon & Michigan

The annual convention of the Oregon Independent Telephone Association, on June 26, proved again to be a very successful meeting and showed that the Association is making steady progress in its post-depression recrudescence. The meeting was held at the Portland Hotel in Portland, Oregon. The attendance was larger than at last year's convention. The secretary announced that the number of companies with paid membership had increased during the year by 240%.

The convention unanimously re-elected the existing officers of the association. These are: President, Chas. E. Wells, president of the Northwest Telephone Company, Hillsboro; secretary-treasurer, Leslie A. Gritten, district manager for the West Coast Telephone Company, Forest Grove; Directors, Lowell Brown of the Interurban Telephone Company, Silverton; F. M. Ferguson, Aurora Mutual Tel. Co., Aurora; C. H. Miller, Mt. Hood Telephone Co., Durfur; Geo. Muhle, Oregon-Washington Tel. Co., Hood River, and W. A. Schaefer, Tri-County Telephone Co., Cloverdale

In addition to the above former officers re-elected, two new directors were added. These are Mr. T. J. Wells of the Northwest Tel. Co., Redmond, and Mr. J. W. Kirby, Columbia Utilities Company, Klamath Falls.

The convention accepted the invitation of Mr. Dean, President of the Oregon-Washington Telephone Company, to hold a joint convention with the Washington Independent Telephone Association next year. This convention will be held at Hood River, Oregon. It was felt that a great deal of good would accrue and interest would be stimulated by such a joint convention. It is the intention to allow suitable time for each state association to discuss its own local affairs separately, but to make most of the educative and social features of the convention accessible to all.

Michigan Meeting

Meeting at Lansing, Mich., on July 26 and 27, the Michigan Independent Telephone Association convened for their annual conclave with an attendance that broke records of several years past. The president, O. M. Vaughan, South Haven, was re-elected, as was vice president W. J. Melchers, Owosso, and secretary-treasurer Jane McNally, Lansing.

Directors for the coming year are: Dist. No. 1, H. R. Christianson, Muskegon, and R. C. Smith, Homer; Dist. No. 2, Chas. W. Cheeney, Chesaning, H. S. Bradstreet, Rollin, and W. R. Stafford, Port Hope; Dist. No. 3, B. R. Sage, Central Lake, and Ernest Sprague, Lake City; Dist. No. 4, L. W. Reynolds, Ontonagon.

Speakers included Mr. Vaughan, Mr. Cheeney, Mrs. McNally, Guy Green, of the Michigan Bell, Detroit; Miller Dunckle, Michigan state treasurer; Louis Pitcher, Chicago, who made a flying trip from Washington to present the Wage-Hour and other pressing questions; Fred M. Crapo, Indiana Steel and Wire Co., Muncie, Ind.; Ray K. Holland, Michigan Public Service Commission; Chester M. Martin; B. C. Schweitzer, Owosso, who "pinch-hitted" for Ranford Dunlap, Ft. Wayne, by pre-

(Please turn to page 30)

A group in conference at recent Oregon Convention.

Texas Appeals Court Reverses REA Suit

On the 16th day of May 1938, W. O. Hall, owner of the Hall Telephone Exchange at Lohn, Texas in McCulloch County, filed a law suit against the McCulloch County Electric Cooperative Incorporated, asking for injunctive ruling against said Cooperative. Complaint was made because the telephone company knew from past experiences of other telephone companies that when the Cooperative energized its lines with electricity that inductive interference would result and cause the service of the Hall Telephone Company to be impaired to such an extent that the subscribers of said telephone company would not be able to carry on conversations over their telephone lines.

The Hall Company requested the Court to restrain the Cooperative from energizing their lines until said Cooperative had paid into the Court an amount sufficient to metallicize plantiff's lines. At the time the suit was filed the Hall Telephone Company was operating a grounded telephone system.

This suit was won by the telephone company before a jury of twelve men in the lower court, all special issues submitted to the jury were answered in favor of the telephone company.

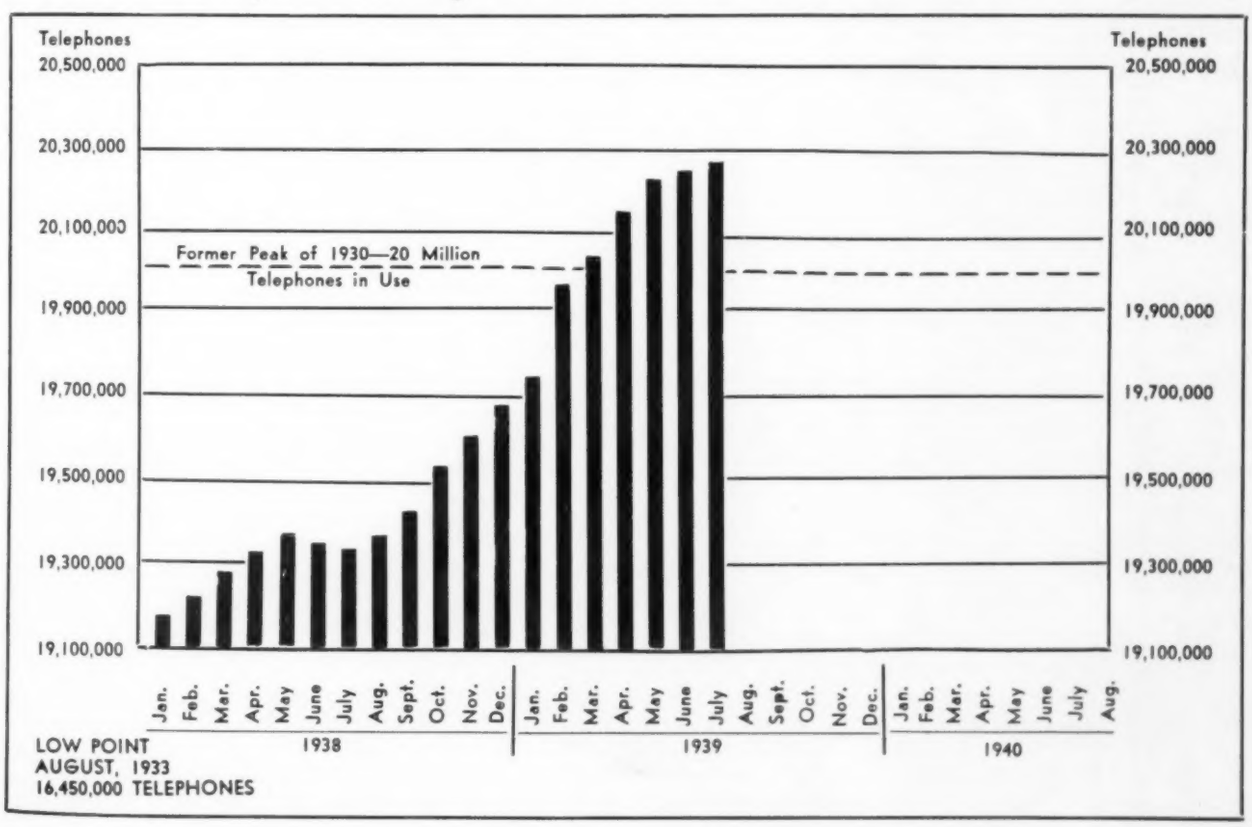
During the trial of the case before the 35th District Court in McCulloch County, several telephone men appeared as witnesses, as follows: R. G. Hall and W. O. Hall of the Hall Telephone Company; Oscar Burton, Manager of the Gulf States Telephone Company; R. L. Lindsey of the Burlington Telephone Exchange; T. R. Cronkwright of the Pear Valley Telephone Company; John Roper of the Rosebud Telephone Company; J. M. Cehand of the Briggs Telephone Company. Melvin Davis of the Florence Telephone Company; H. M. Hammond of the Southwestern States Telephone Company; and B. C. Burden of the Lincoln Telephone and Telegraph Company, Lincoln, Neb. The McCulloch Cooperative had several witnesses from different States qualified as engineers of long experience with light companies.

After the decision of the lower court the case was placed on appeal by the McCulloch County Electric Cooperative Incorporated, and on May 8th, 1939 it was argued by both the attorneys for the telephone company and the attorneys for the cooperative before the Court of Civic Appeals in Austin, Texas.

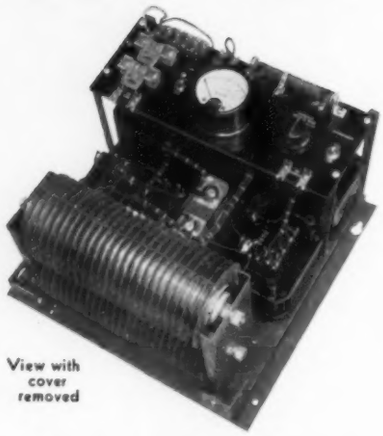
On July 12th the Court of Civic Appeals handed down a decision, Number 8835, written by Judge Blair, in favor of the McCulloch County Electric Cooperative Incorporated known as the appellant. This decision reverses the decision of the lower court. As soon as this case was decided by the Court of Civic Appeals the Texas Telephone Association office notified the board of Directors, and requested them to return in writing their reaction to the decision. From decisions received from the Board of Directors and after a conference with the Attorneys in our case, it has been decided to file a motion for a re-hearing with the Court of Civil Appeals. If the motion for a re-hearing is overruled, attorneys will ask for a writ of error in the Supreme Court of Texas. Since the Court of Civil Appeals will adjourn July 22nd for a vacation period, the motion for a re-hearing will not be acted upon until the latter part of September or the first part of October.

This is the present status of the REA test lawsuit that was filed last year, at the request of the Texas Telephone Association, for the purpose of having a question that has confronted both the telephone people and the light people for many years, settled.

Monthly Telephone Station Barometer



UNATTENDED



View with cover removed

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sented Mr. Dunlap's paper, and Ellmore E. Pollack, Lansing.

The very popular question-box method of open discussion was a huge success with questions being answered by popular discussion from the floor. The entertainment was enjoyable consisting of a banquet with Guy Green serving as master of ceremonies.

Portable Generators In the Telephone Field

(Continued from page 22)

ing horizontal holes under streets or lawns for placing cables or conduit seems far from impossible. There appears to be no doubt but that these sturdy generator sets can be used as a current supply for the operation of all these machines when they make their appearance.

We firmly believe that one of these portable generator sets will prove the most satisfactory investment any telephone company can possible make. This is especially true when we consider the numerous advantages any telephone company can enjoy from owning one. First they are assured Emergency battery charging and light for the exchange in event of a failure of the commercial power supply. Second when used in connection with suitable floodlights emergency night work is made both easier and safer. Third an electric current supply can be made instantly available at any point in the exchange or out on the line for the operation of portable electric, labor saving tools. It is urgently recommended that all telephone companies investigate the possibilities of these portable generating sets in their particular exchange.

Short Course in Telephone Transmission

(Continued from page 18)

apparatus should be of interest to Independent telephone men.

It is possible that load coils may be used in the Independent field more in the future than in the past due to the development of buried wire with the necessity for loading on long leads. Let us next consider the general theory and features of loading.

(TO BE CONTINUED)

--- Safety Bulletin ---

Overlifting is always dangerous. It is specially dangerous, as it may be followed by permanent painful results.

Association Wins Wage-Hour Amendment

(Continued from page 14)

companies, the Wage-Hour fight in Congress was of such a highly-charged, controversial nature which most of the time looked gloomy for any action at all that it was necessary to settle upon a figure, agreeable to all sides, such as the 500-station level. In fact, the representations of the Independent industry brought about the increase of the original figure of 250 stations, proposed by the Wage-Hour Division, to twice that total of 500 stations.

Congressional Action Culminated Seven Months' Task of Independent Industry

The culmination of the Congressional sanction of the telephone exemption was the result of most strenuous activity and efforts of the Wage-Hour Committee of the United States Independent Telephone Association, ably supported by the National Association and State Association officials and many leading executives of independent companies. For seven months, since last January, the Wage-Hour Committee and the Association official staff have had either the entire group or several members in Washington who made continuously a careful and thorough presentation of the facts about the telephone industry to practically every member of Congress and leading Government officials of the Wage-Hour Division, Commerce and other departments. As a result, the industry won the complete confidence and support of Congress and Wage-Hour Administrator Andrews.

The Wage-Hour Committee of the U. S. Independent Telephone Association which was organized at the annual convention of the Association last October was composed of John H. Agee, Executive Vice President of the Lincoln, Nebr., Telephone and Telegraph Co. as chairman; E. C. Blomeyer, President of the Telephone Bond and Share Co., as vice-chairman; John C. O'Connell, President of the Commonwealth Telephone Co. of Wisconsin; R. A. Phillips, general manager of the Central Electric and Telephone Co. of Sioux City, Ia.; and W. C. Henry, Vice President and General Manager of the Northern Ohio Telephone Co.

ALL of the officers of the National Association aided and worked with the Wage-Hour Committee. They included B. L. Fisher, President of the Lee, Va., Telephone Co. and National President; Executive Vice President

Louis Pitcher; Secretary-Treasurer Charles C. Deering; and General Attorney Alfred L. Geiger, Washington representative. Many state secretaries cooperated in the activities and among the state association officials who came to Washington were S. A. Lane, president of the Arkansas state independent telephone association, and James M. Cox, former president of the Tennessee Association, and other important telephone officials who aided in the work in the National Capital were Judge W. F. Boggess, counsel for the San Angelo, Texas, Telephone Co., and former Congressman J. L. Milligan, counsel for a number of leading Independent companies in the Middle West and Southwest.

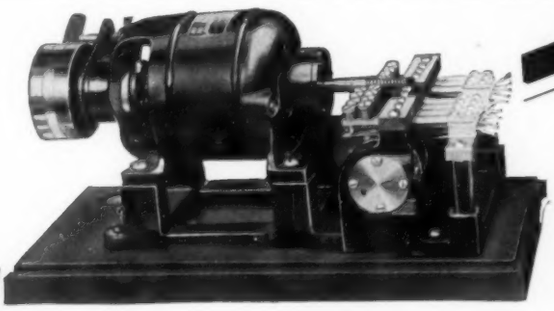
Wage-Hour Administrator Andrews to Make Legal Analysis of Amendment

Since Presidential approval has been received for the telephone exemption amendment Wage-Hour Administrator Elmer F. Andrews will institute a legal analysis of its scope and in the early fall will issue a legal interpretative bulletin, it is expected, which will describe officially its coverage and administrative character.

The most important aspect of the Herring telephone exemption amendment is that it appears to permit definitely the averaging of stations in an exchange over a year's period. The previous amendment, which had been drafted by the Wage-Hour Division and was included in the two Norton bills and the Barden and Ramspeck measures, had provided that, if any time during a year an exchange exceeded 500 or more stations, its operators would become subject to the Wage-Hour law. This hardship was rectified by the Wage-Hour Committe of the U. S. Independent Telephone Association after many conferences with the Wage-Hour Division officials and leading sponsors of the legislation in Congress and represented a potent victory for the Independent industry.

THE telephone exemption amendment will relieve from the Wage-Hour statute's provisions the exchanges of less than 500 stations in the rural areas served both by the Independent industry and the Bell System.

The House action on the Herring bill came with the swiftest sort of legislative procedure. As soon as the Senate passed the measure and transmitted it to the House, Chairman Norton of the House Labor Committee, who cooperated notably with the Independent telephone officials during the entire session, summoned her committee in a



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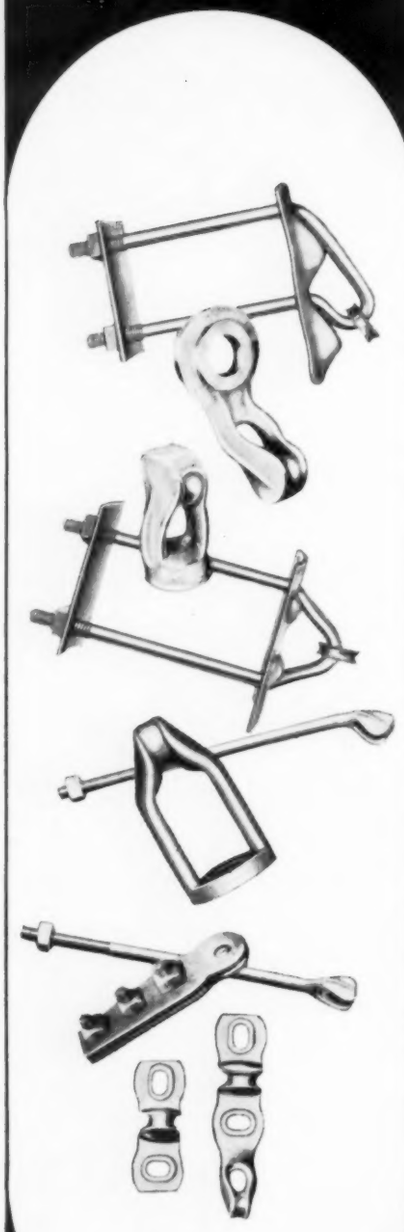

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special session and secured unanimous approval for the proposal. The bill then was placed on the House calendar. Then, two days before the adjournment, Rep. Ramspeck (D., Ga.), ranking Democrat on the Labor Committee, after a series of conferences with the House leadership, including the Republican chief, Rep. Martin of Massachusetts, brought up the measure under unanimous consent. After a few minutes discussion in which Rep. Ramspeck epitomized the universal sanction of the telephone proposal by saying "I think every one is in favor of it," the bill was passed—the final enactment by Congress.

The procedure enabled the telephone exemption amendment to escape the fate of the other revisions of the Wage-Hour law, including the proposed freezing of telegraph messenger minimum wages, which died in the other Wage-Hour bills. If the telephone amendment had had to wait its turn to be considered when the controverted Barden measure was being pushed, it would, likewise, have been scuttled. Therefore, the Congressional leadership with the agreement of the Wage-Hour officials utilized the unanimous consent procedure. A safer strategy had been projected to bring up the bill after the adjournment resolution had been filed in the House because such action permits suspension of the rules. But the general agreement on the measure led to the choice of the unanimous consent plan.

New FCC Chairman Fly Will Strengthen Commission

THE Federal Communications Commission was strengthened considerably with the appointment of a new Chairman, James Lawrence Fly, general counsel of the Tennessee Valley Authority, who is to take the place of the retiring Chairman Frank R. McNinch on Sept. 1.

The appointment brought a comparatively young man to the helm of the FCC, because Mr. Fly—a tall (6 feet, 3 inches), lean man, born and brought up in Texas—is only 41 years old. A most able lawyer who had graduated from the Naval Academy and served several years in the Navy. Mr. Fly is regarded as fair-minded and level-headed in his deliberations upon issues and problems and as a person who weighs carefully all the facts before rendering a decision. The new FCC chairman-to-be is described as having the liberal viewpoint—a liberal of the constructive type, ready to recognize the achievements of the industry under regulation, but prepared and vigorous in his defense of the public interest and rights when defects or evils appear in the regulated industry. But he is not the type of liberal that is dogmatic, refusing to budge from his preconceived position, nor is he bombastic in his views and a seeker after personal fanfare and publicity.

Mr. Fly has had a notable governmental legal career—so his appointment to the FCC is clearly one of merit and career promotion rather than a political selection. He has served in the government legal service in two Administrations under Presidents Hoover and now under President Roosevelt. In the Hoover Administration, he became a special Assistant to the then Attorney General Mitchell in 1929 and was assigned to handle a number of important anti-trust cases against the sugar, wool, baking and other industries. When the Roosevelt Administration came in in 1933, he remained at the Justice Department in the same capacity and was in charge of several important cases of the Agricultural Adjustment Administration, the Oil Code and the NRA, handling the Weirton Steel labor case under the NRA. In the summer of 1934 he was appointed general solicitor of the Tennessee Valley Authority and in 1937 was named its general counsel. While in the TVA, he handled the major TVA cases which were upheld by the U. S. Supreme Court and also was the counsel for the TVA majority, Lilienthal and Harcourt Morgan, in the investigation of the feud with former TVA chairman Arthur Morgan.

His service with the TVA has given Mr. Fly a well-grounded foundation in utility regulation and knowledge of the various phases of utility operation and financial structure which go into the makeup of the rate base. Of course, he has had no direct knowledge of the communications industry—telephone and telegraph—out of his TVA career, but, according to associates, he is the type who will quickly grasp the facts and situations about his new field. Curiously, the new Chairman has had in his early school days a brief taste of the telephone industry — during vacation periods he worked as a switchboard op-

--- Safety Bulletin ---

When the doctor says "three weeks" in the hospital as the final words after an accident, then it will be altogether too late to plan the necessary steps required to safeguard the job and thereby prevented the accident.

erator at the exchange of the Independent telephone company which served his home town of Seagonville, Texas.

MR. FLY believes in stiff regulation of any monopoly utility—as that is the only method of producing the effects of competition to guard the public interest. While he does support government ownership of power developed on navigable streams where flood control and navigation must at the same time be performed by the government, he does not feel public ownership of utilities should result unless the regulation of a monopoly utility proves unsuccessful.

The addition of Mr. Fly brings another Navy man to the FCC. The Naval Academy graduates and former Navy officers at the Commission include Commissioner T. A. M. Craven, Chief Engineer E. K. Jett, Assistant Chief Engineer Andrew W. Cruse and a number of Commission engineers. Mr. Fly graduated from the Naval Academy in 1920 and served in the Navy for three years as an officer with the fleet on the Pacific Coast and at Honolulu. He then, after his retirement, went to the Harvard University Law School and graduated, after winning scholarships each year, in 1926. After practicing three years in New York City, he joined the U. S. Justice Department.

The new FCC chairman comes from distinguished forbears. His family settled at Jamestown, Va., in 1636. After the Revolution they moved to North Carolina and then later to Tennessee. His grandmother, whose husband was killed in the Confederate Army in the Civil War, moved to Texas with her children and settled at Seagonville, twenty miles south of Dallas.

FCC's Plan to Expand Telephone Regulation Rejected by Congress

THE plans of the FCC to launch an immediate expansion of its telephone regulatory activities to carry out many of the projects and studies developed in the three-year investigation of the American Telephone and Telegraph Co. and Bell System failed to materialize, when Congress in considering its last major appropriation bill, the Third Deficiency, rejected a $210,000 supplemental fund for the Commission.

As a result, the FCC telephone regulation will remain at the same rather slow tempo of activity as had existed during the past fiscal year. Of course, the Commission proponents of the expansion of the telephone regulations functions will, in all probability, present another plea for funds for that task at the next session of Congress.

In this quest, the FCC will probably try to use the springboard of the Telephone Investigation Report, which is before the Senate and House Interstate Commerce Committees. But, if the recent views of Congressional members of the House Appropriations Committee in studying the rejected $210,000 fund for the FCC is an illustration, the Telephone Investigation report is also likely to encounter tough sledding.

In the hearing on the plea for the added $210,000 fund before the House Appropriations committee, handling the Third Deficiency bill, both the Democratic and Republican Representatives submitted FCC Commissioner Paul A. Walker to an extremely stiff examination.

One Representative, Johnson, a West Virginia Democrat, who had experience in telephone regulation as general counsel of the West Virginia Public Utilities Commission, particularly interrogated Commissioner Walker strenuously on the need for the expanded regulation. He kept insisting that, instead of lengthy hearings and investigations, regulatory adjustments and rate matters could be settled in conferences and "in a businesslike way" in discussions around the table. He stressed that one criticism of the present Federal Government activities was that it was invading the

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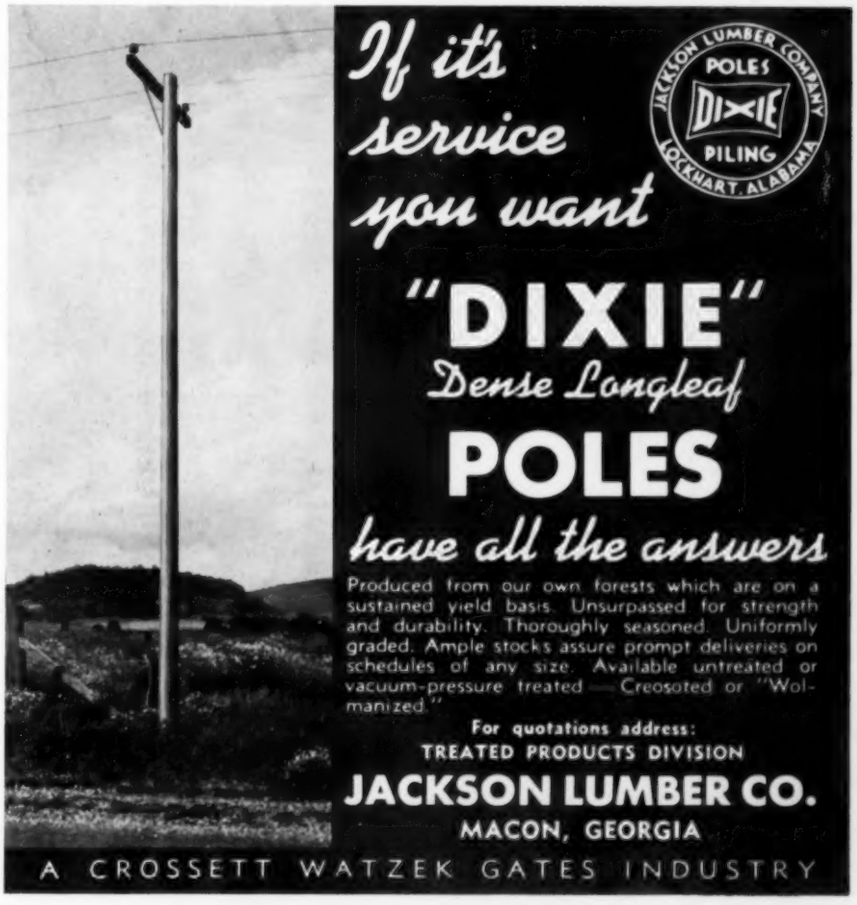
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field of private business management and burdening business with too much, futile regulation. Rep. Ludlow, Indiana Democrat, cited that telephone companies had to file with the FCC too many reports which were burdensome and expensive and that these reports should be simplified and made more useful. Several other Congressmen questioned the FCC Commissioner to ascertain whether the $1,500,000 Investigation was completed.

THE House Appropriations Committee rejected the $210,000 fund, despite the appeals of two other spokesmen. Clyde Bailey, Executive Secretary of the National Association of Railroad and Utilities Commissioners, contended that the increasing of the FCC telephone regulatory activities would be very beneficial in aiding state commissions in their rate and regulatory cases. Because the pending investigation of interstate toll rates in Washington state was the mainstay of the FCC proposal for its additional fund, Rep. Leavy, Washington Democrat, who spoke for the other members of the Washington House delegation, cited that this interstate toll rate inquiry was greatly desired by the people of his state.

Commissioner Walker defended the necessity for the $210,000 fund because of the many important problems of telephone regulations now before the FCC. He cited that, besides the interstate toll rate cases, the FCC had to study allocation of property, revenues and expenses between local exchange and long distance operations of the telephone companies; the license contract payments of the Bell System; the costs and prices of Western Electric Co., the Bell System manufacturing company; and depreciation. He also cited the division of interstate tolls between the Bell System and Independent telephone companies as another subject of study.

No Summer Slump In Station Installations

The American Telephone and Telegraph company announced August 2, its subsidiaries in the Bell system had a net gain of 11,200 telephones in service during July. In July, 1938, the companies showed a net decrease of 6,700 stations.

H. D. Early Appointed Manager of Ohio Company

Selection of H. D. Early, former commercial superintendent of the Portsmouth (O.) Telephone Company, as general manager of the Citizens Telephone Co., of Circleville, was announced the latter part of July following the retirement of E. W. Lutz, manager since 1902.

During the managership of Mr. Lutz the Citizens Telephone Company has grown from less than 400 stations to its present service to approximately 3000 subscribers, according to the Circleville Herald who made the formal announcement of the change. The company has four exchanges located at Circleville, Williamsport, Ashville, and Laurel.

J. D. Kennedy Retires

A testimonial dinner was tendered Jerome D. Kennedy, general sales manager of the Western Electric Company, at the Hotel New Yorker July 27. Mr. Kennedy retires from the company on August 1 after more than forty years of service, the last twelve of which was in New York as head of the nation-wide distributing organization for the Bell Telephone System.

W. F. Goodrich Retires

The following story appeared in the LaCrosse (Wis.) Tribune on July 16.

"One man in this town will not get any advertising out of this notice because he has retired after 32 years service as secretary, treasurer and manager of the La Crosse Telephone company.

W. F. Goodrich has just recently received a certificate as a life member of the Telephone Pioneers of America conferred on him by the directors of that organization in New York "in recognition and appreciation of many years of loyal and devoted service rendered during employment in the telephone industry," and signed by Walter S. Gifford, president. Needless to say Mr. Goodrich greatly appreciates this honor."

Sale of 'Phone Plants Approved

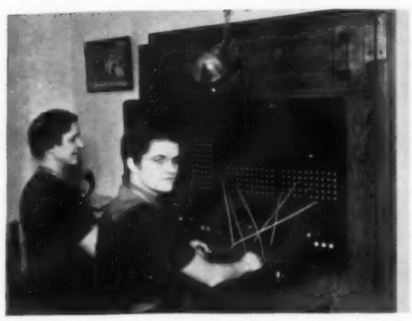
The Oklahoma Utilities Commission on July 14 authorized the sale of nine telephone exchanges owned by the Southwestern Bell Telephone Company and the Western Arkansas Telephone Company to James Thompson of Muskogee, Okla. Plants owned by the Southwestern Bell Telephone Company at Plainview, Danville, Hartford, Mansfield, Belleville, Ola and Magazine were sold for $7000 and exchanges at Branch and Charleston, owned by the Western Arkansas Telephone Company, were sold for $5,000.

Mr. Thompson said improvements will be made on the properties. The commission authorized him to issue notes and mortgages against the plants.

Masterbuilt Junior for Warrenton, Missouri

By C. D. BARNES

Kellogg Representative



Warrenton's new Masterbuilt Junior switchboard is set into the wall with the rear opening into the terminal room.

WARRENTON, Missouri, is a typical American small town. County seat of Warren County, its population of 1,400 earns its living both in farming and industry. Just 65 miles west of St. Louis. Consequently, Warrenton is strongly "big city" conscious and endeavors to keep right up with the parade of progress in all its civic activities. True, Warrenton probably doesn't expect great expansion in the years to come, yet it does want big city conveniences and modern utilities.

Just recently the old magneto telephone system was replaced by a modern common battery plant. Mr. Carl Kind, owner and manager of the Warrenton Telephone Company, was the man responsible for this progressive move. Mr. Kind long realized the need for a common battery system in his town but it was not until he had learned the advantages of the Kellogg Masterbuilt Junior Switchboard did he act. With this equipment Mr. Kind quickly saw that he could provide common battery service at a lower operating cost and secure higher rates for the service. At the same time subscribers would be assured prompt, reliable service without the nuisance of cranking or ringing off. Transmission would be uniform—recalls could be made immediately. Batteries at subscriber's station too could be eliminated, because current would be supplied to telephones by a simple power source at the main exchange.

With so many advantages and the possibilities of greater earnings, it was not long before Mr. Kind had purchased and installed complete new central office equipment.

The Kellogg Masterbuilt Junior common battery switchboard installed has a capacity of 400 city lines and 80 rural lines. The unit consists of two positions, each with 200 lines capacity, located side by side on a non-multiple basis. The Masterbuilt Junior may be equipped with universal cord circuits too so that magneto lines can be converted one or more at a time to common battery.

WARRENTON now has 305 subscribers and with the town folks appreciating their new "big city" telephone service more and more, prospects for increases are excellent.

Mr. Kind has gone a step further by making available to all subscribers modern Kellogg desk set and wall Masterphones. These self-contained attractive instruments add the final note of perfection and smartness to the new system. While at present, a slightly higher rate is in effect for the self-contained Masterphones, the company has a program outlined that eventually will replace all old instruments with the new Masterphones.

Executive Change In Koppers

Mr. C. D. Marshall, Chairman of the Executive Committee of the Board

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Only ONE Contact!

Price $44.00

F. O. B. factory

For better and cheaper ringing.

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CABLE TERMINAL

Reliable

Type RU unprotected terminals are easy to install, easy to work on and built to outlast the cable.

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Telephone Engineering — Construction Supervision — Appraisals — Financial — Rate Investigations
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CLASSIFIED

POSITION WANTED: As combination man or lineman with independent company, by young man of good character, single, with no encumbrance, 8 years experience with magneto and central battery systems with Bell Company; also have line construction experience, can furnish good reference, not afraid of work, available immediately, location immaterial. Box 8233. TELEPHONE ENGINEER.

of Trustees of Koppers United Company, resigned July 24.

To succeed Mr. Marshall as Chairman, the Executive Committee has elected J. T. Tierney to this position. Mr. Tierney also continues as President and Mr. Marshall retains his membership on the Board.

Mr. Tierney will also be Chairman of the Board of Koppers Company, resigning his position as President of this principal operating unit of the Koppers organization.

Lineman's Data Book Available

A new 96-page data book for linemen is available free of cost to readers of TELEPHONE ENGINEER. The data book contains all charts and data on wire and cable sizes, copper and aluminum. It gives strand strengths and sizes. Information on equations. Rules for the care of leather to insure longer life and pliability. First Aid instructions covering eyes, bleeding, resusication, etc.

It is pocket size to fit the lineman's pocket or tool box and should be in the kit of every telephone man. For your free copy address Mathias Klein & Sons, 3200 Belmont Ave., Chicago, and mention TELEPHONE ENGINEER.

New Literature Available on Raytheon Rectifilters

A new bulletin No. DL48-156-D giving detailed information on new prices and new sizes of the Raytheon Telephone Rectifilters (battery eliminators) may be obtained by readers free of charge by writing Raytheon Manufacturing Company, 134 Willow Street, Waltham, Massachusetts.

National Tel. Supply Opens Coast Office

The National Telephone Supply Company of Cleveland, Ohio, manufacturers of Telephone, Telegraph, Railroad and Light and Power Line materials, announces the opening of a new Coast Office in San Francisco, California.

This office will be in charge of Mr. John E. Winchester and will serve the terri-

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CEDAR POLES
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Finished Cedar Poles
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FOR SALE: Independent telephone company, local and long distance, of 500 odd stations, situated in valley principally agricultural with growing rural manufacturing. Plant and system in excellent condition. Minimum of maintenance necessary. Box 801-S TELEPHONE ENGINEER.

WANTED: Installers capable of supervising and/or installing all kinds of automatic and manual central office equipment. Must be willing to travel. In reply state age, experience, education, nationality, number and age of dependents, salary expected, present location, past employers, and type of equipment you have installed. Write Box No. 8238.

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For the convenience of readers of Telephone Engineer

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RECONDITIONED EQUIPMENT

No. 4 LINE DROPS
No. 69 LINE JACKS
No. 94 KEYS
No. 4 PLUGS
3, 4, 5 BAR GENERATORS
1000-1600 OHM RINGERS

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Write for prices.

◆

Buckeye Telephone & Supply Company
COLUMBUS, OHIO

RECONSTRUCTED EQUIPMENT

Stromberg Carlson No. 101 P. B. X. Switchboard equipped with 60 local line lamps and 5-lamp trunk Ckts. 5-pairs of plugs and cords. Opr. set, etc.	$150.00
Kellogg No. 1809 Wall type Grabaphone hand sets 3-bar 1000-1600 or 2500 ohm ringer $10.00 — 4 bar $11.00 — 5-bar @	12.00
Western Elec. No. 38 Latest type 1000 or 2500 ohm ringers with 3 inch gongs	2.25
Kellogg No. 18 Heavy duty repeating coils @	5.00
Kellogg No. 11 or No. 12 Grabaphones with 4 Cond. Cord for wall sets @	3.50
Western Elec. No. 22c Combine line drops and jacks per strip of 5 @	8.75
Kellogg No. 301 E 500 ohm combine line drops and jacks per strip of 10 @	16.00
15 Amp. double pole double throw knife switches @	.35
Leich or Monarch Local Battery Transmitters complete with mouthpieces @	.90
Western Elec. No. 1269A Main frame protectors with heat coils and carbons per 20 line strip @	12.00
Gray No. 11 3 slot wall Pay Stations for 5-10 and 25c coins @	6.50
New Swbd. Plugs, Kellogg No. 42—W. E. No. 47 S. C. @	.60

REBUILT ELECTRIC EQUIPMENT CO.
Not Inc.
1934 WEST 21ST ST., PILSEN STATION
CHICAGO, ILL.

tory from California to Montana and Canada to Mexico.

Mr. Winchester has been a member of the sales organization of The National Telephone Supply Company for a good many years and is thoroughly conversant with telephone and power company line requirements.

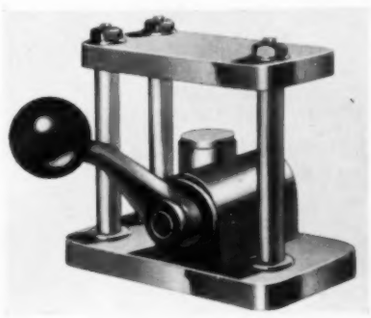
"Stretchem" Rubber Telephone Base Rings

A new product of much interest to telephone men everywhere is the new "Stretchem" rubber telephone base rings introduced this month by the manufacturers, The Telephone Repair Company, 1760 Lunt Ave., Chicago.

This band, made of pliable elastic rubber is easily and quickly placed without the use of tools. It gives a more pleasing appearance and longer wearing qualities than either felt or leather. See advertisement at the top of next column of this page.

The New "Mijit" Drill Jig

The new Esco "Mijit" pump jig, particularly designed to meet requirements of small parts manufacturers, weighs less than six lbs.; working areas range from 1¼ x 2¼ inches in the smallest type to 3 x 3 inches in the largest type, and positive lock is provided.



Benefits claimed are increased production through quicker loading and unloading time; less operator fatigue and reduction of rejections due to imperfect work.

Cost of jig plus work holding units is somewhat less than that of fixtures specially designed for the purpose. One jig can be adapted to numerous parts, thus reducing capital investment. It is made by Esco Engineering & Sales, Inc., 4612 Woodward Avenue, Detroit, Michigan.

Specialists in Rebuilding and Repairing

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"STRETCHEM"
RUBBER RINGS FOR DESK STAND BOTTOMS

Made of new rubber, pliable and elastic, no tools required. They are easily and quickly attached to Western Electric, Auto Electric or Kellogg desk stands and will wear longer and look better than felt or leather.
EACH 30c . . . . . PER DOZEN $3.00

RELIABLE ELECTRIC NO. 977, Substation protectors complete with fuses and carbons ..... .65

RELIABLE ELECTRIC NO. 27-A, Cable terminals complete with fuses and saw tooth protectors.

16 pair less stub	$ 7.00
16 pair with stub	11.00
51 pair less stub	26.00
Western Electric No. 67 and No. 73 Heat Coils	.10
Western Electric No. 7A Fuses	.06
Western Electric No. 11C Fuses	.10

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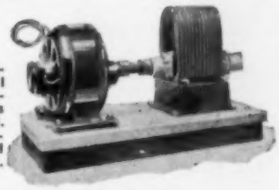
The most dependable of all ringing machine—operates from 110 A.C. current—Rebuilt A No. 1 condition. $25.00.



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Six sizes carried in stock. Any size made to order. Write for prices and description.

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POSITION WANTED—Young man, 28, with 8 years experience in all departments telephone work. Have done cable, live construction, plant, accounting including depreciation study. Will go anywhere. Speak Spanish. Excellent references. Reason for unemployment, retrenchment on seniority basis. Address—J. O. Whalen, Carlisle, Indiana.

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a telephone exchange of not less than 500 stations. Must be in the South. Texas preferred. Would consider several exchanges if grouped in same vicinity. All offerings will be treated as confidential. Answer Box 8237.

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New Vincent
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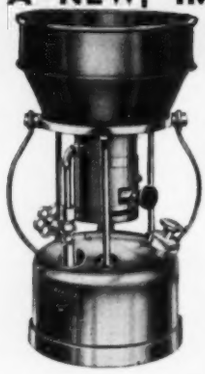

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Additional Features: Long-life figure "8" generator—with orifice scraper. Rugged semi-steel top plate. Powerful pump. 16 gauge welded steel tank with bottom shock ring. Size—8" x 13". Weight—15 lbs. Popular size for 6", 7", and 8" pots.

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If clear white gasoline is hard to get, order the Kerosene Furnace. You'll like it.

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2 No. 90 Common Battery Set—Ind. Coil and S. L. Ringer in Base - Price $17.45